

## Report of the Instream Flow Task Group

### Objectives and Goals

The objective of the Instream Flow Task Group is to develop a strategy for Central Puget Sound basin that:

- Achieves instream flows in rivers and their tributaries in the Central Puget Sound basin by;
  - Confirming and enforcing existing flows
  - Modifying existing flows as needed based on new information;
  - Setting new instream flows on those rivers and streams without existing regulatory instream flow.
- Provides the State what it needs to know in order to make informed decisions, and to help develop a common understanding of what information is lacking.
- Identifies a process for resolving conflicts between instream and out of stream water uses; Retains flexibility to take into account uncertainty, changing conditions, and new information;
- Identifies a process for dealing with potential long-term climate change;
- Works in unison with, and complementary to, Shared Strategy, ESA planning efforts, CWA efforts, and existing WRIA basin planning processes;
- Identifies management strategies or tools that can be used to address instream flow/habitat issues;
- Provides a range of options for achieving instream flows;
- Identifies interim and/or short term actions that do not preclude long term actions;
- Identifies and addresses cross-WRIA instream flow issues.

We articulate why stream flows are important, outline our existing management framework, point out deficiencies in the existing framework, define a set of recommended actions, and offer options to manage instream flows more effectively in the future.

The goal is to have instream flows that are biologically defensible, hydrologically possible, achieved with a high degree of certainty, that contribute to properly functioning freshwater conditions and managed in a manner that supports vibrant communities and a health economy.

### Why instream flows are important?

Adequate stream flows are important for several reasons. For example, they are necessary for certain instream functions, especially the survival of fish and wildlife. They are also necessary for out-of-stream “consumptive uses”, such as irrigation and domestic water supply. Flow levels have an important effect on navigation. And stream flows contribute to the scenic and aesthetic qualities of natural settings. Flows influence ground water levels, as well as other surface water bodies (e.g., wetlands, lakes, and ponds).

Flows affect the overall health of aquatic systems and stream functions. For example, it is a crucial determinant in the health of fish stocks. Fish feed on insects drifting in the currents. Young salmon are carried along by flowing waters. Low summer flows can result in fewer fish. As flows subside during the summer, fish tend to congregate in pools, which can increase their vulnerability to predators. Late summer and early fall low flows make it difficult for salmonids to migrate to the spawning grounds and spawn. Less water heightens competition for food. Fish can be stranded if the water continues to recede. In addition, low flows often lead to warmer water temperatures, which can increase fish mortality.

Stream flow is an important aspect of water quality. In Washington, more and faster flowing water generally means cooler water temperatures (although other factors are involved). Cooler water is generally better for fish. Reduced flows can also lead to higher concentrations of substances that have been discharged to a stream or other water body. If the amount of water is reduced, but the amount of the substance in the stream is not, the concentration (and often the toxicity) of the substance becomes increased (because there is less water to dilute it). Consequently, insufficient flow can contribute to exceeding state water quality standards. Stream flows are taken into consideration when water quality permits are processed. *(find factoids on water quality and insert)*

Stream flows can influence instream values besides fish and water quality. Many wildlife species are stream or riparian dependent ("riparian" refers to aquatic systems with flowing water - e.g. rivers, streams, springs - as well as the adjacent areas.). If stream flows are reduced, the associated riparian vegetation may change as well.

Aesthetic and scenic values are influenced by the flow level in a stream. And higher flows are generally necessary for navigation. Flows affect recreational activities such as boating, rafting, and kayaking, as well as navigation on a larger scale.

### Existing Conditions

The law in our State has recognized the value of water instream since 1949 (see Chapter 77.55 RCW) when it was decided the policy of this state is that a flow of water sufficient to support game fish and food fish populations be maintained at all times in the streams of this state. The Department of Ecology gave the predecessors to the Washington Department of Fish and Wildlife (WDFW) notice of each application for a permit to divert or store water. WDFW (or predecessors) then had thirty days after receiving the notice to state his or her objections to the application. Ecology may refuse to issue a permit if, in the opinion of WDFW, issuing the permit might result in lowering the flow of water in a stream below the flow necessary to adequately support food fish and game fish populations in the stream. Many small streams in Central Puget Sound basins were closed to further consumptive water use under the WDFW recommendations.

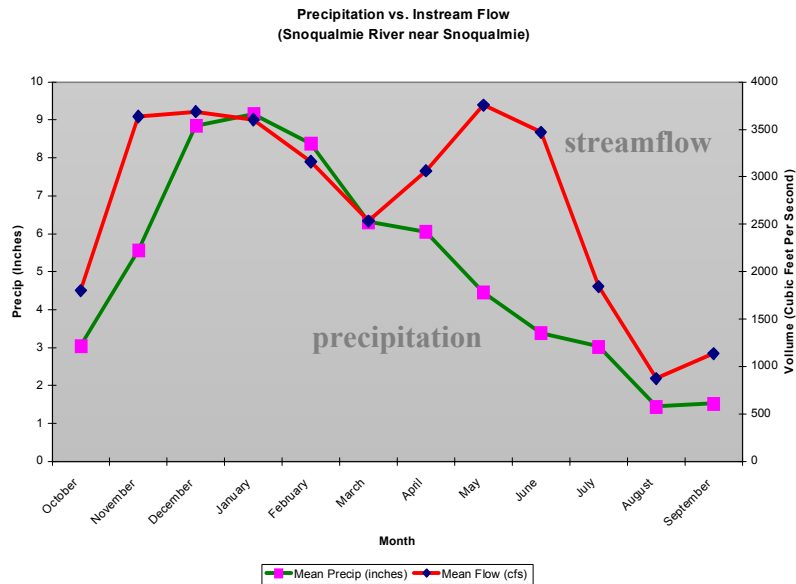
Later, in 1969, the first law requiring the adoption of instream flows was passed (see chapter 90.22 RCW). Another law on instream flows was adopted in 1971 and it states

that “Perennial rivers and streams of the state shall be retained with base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values” (see the Water Resources Act of 1971, chapter 90.54 RCW).

The volume and flow of water in a stream, at any point in time, are influenced by many factors, including recent rainfall, snow or glacial melt, temperature, vegetative cover, characteristics of the soil and geology, and the amount of water (ground water) moving through the soil and feeding into the stream. Seasonal fluctuations are common, with more water, higher levels and faster flows in the winter and spring, and less water, lower levels and slower flows in the summer and fall. Volume and flows also vary from place to place along the stream: at narrow points of the channel the water may be fast moving but low in volume, whereas at a wide point in the stream the same amount of water may move quite slowly. The general meaning of a flow in a stream at any given time is “stream flow.”

The term “instream flow” is used to refer to a specific stream flow for a specific location at a specific time. Instream flows are usually identified as the stream flow needed to protect or preserve one or more instream resources or values. They are most often described and established in a formal legal document, typically an adopted state rule. Once defined, an “instream flow” is a water right and is used by the State for water management decisions, including regulatory decisions regarding future water appropriations (that is, water distribution).

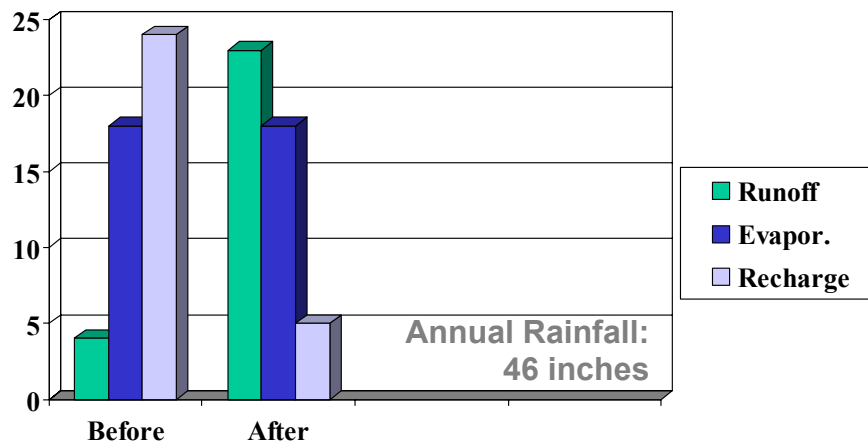
A typical hydrograph for streams in the Central Puget Sound region shows that low flows naturally occur during the late summer and early fall.



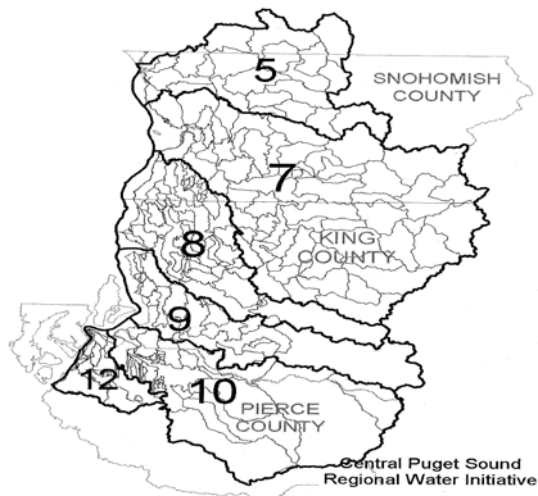
During dry season, flow in streams due to ground water discharge (base flow) averages about 75% to 85% of total stream flow, statewide. Often fisheries resources are impacted by the lowest flows of the river. The fall is also when salmon are returning to natal streams and the need for water to pass the fish to the spawning beds and for spawning is greatest.

In urban and urbanizing environments, the most significant changes to stream hydrology are caused by sewer installation and area and the water impervious areas associated with urbanization. Aquifer management in the tributary stream systems is critical to maintenance of base flows. We collectively need to reevaluate our stormwater management, our construction methods for installation of sewers and our well head protection programs to better maintain the infiltration of water. The maintenance of ground water recharge is critical for streams, but also for those public water systems dependent on ground water wells, a very significant number of people in the greater Central Puget Sound region.

## Urbanizing land use ~ changes hydrology



### Regulatory Framework



Given the statutory directives of chapters 90.22 and 90.54 RCW, Ecology has adopted rules for several river basins or watersheds overlain by the CPSI. The river basins or

watersheds are called Water Resource Inventory Areas (WRIAs) and instream flow rules have been developed as follows:

WRIA 5 Stillaguamish - no instream flow rule  
WRIA 7 Snohomish - rule adopted in 1979  
WRIA 8 Cedar - rule adopted in 1979  
WRIA 9 Green - rule adopted in 1980  
WRIA 10 Puyallup - rule adopted in 1980  
WRIA 12 Chambers/Clover - rule adopted in 1979

Instream flow requirements are made a proviso of all water right permits issued when the exercise of the permit may impair the instream flow. The instream flow is a specific volume of flow in cubic feet per second measured at a stream gauge. The stream gauge is the control point. In some cases the state will require the permittee, as a condition of the right, to establish a control point and to measure the flow. The State then depends on voluntary monitoring of the instream flow by the permittee and compliance by the permittee when the instream flow is not being met.

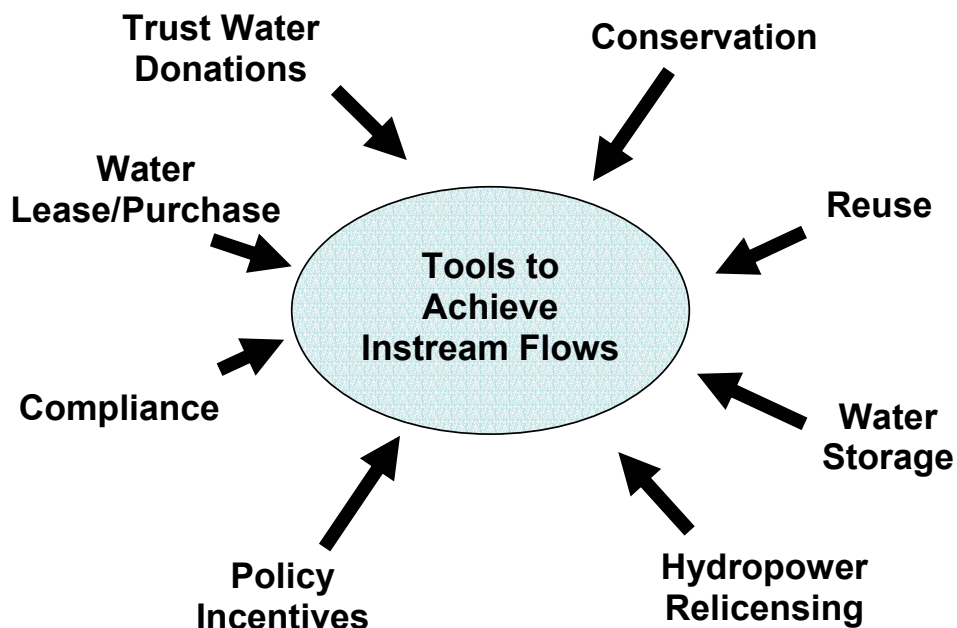
The general management approach used to adopt an instream flow rule includes five parts as follows:

- Needs identified;
- Studies;
- Instream flow negotiated;
- Instream flow recommended; and
- Rule development.

The instream flow programs adopted in the Central Puget Sound region were based on a combination of the standards method (50 percent exceedence flow) and points awarded for various instream values to protect. For more on how the flows were established see the specific environmental documents supporting a basin's instream flow and the final environmental impact statement for the Western Washington Instream Resources Protection Program done in June of 1979. The instream flow programs developed were not solely based on the biological needs of fisheries resources. As with any standards based method of determining an instream flow, the flow was not intended to be satisfied all the time. In fact an instream flow based on a 50 percent exceedence flow can be expected to be achieved, at best, 50 percent of the time. Existing instream flows have been met in some rivers based on agreements from larger users.

In addition to the instream flows adopted by the State, instream flows in several river systems are governed by Habitat Conservation Programs and/or Federal Energy Regulatory Commission flows imposed on hydroelectric projects.

Since flows were adopted many tools have come into being that may help met flows on a more regular basis. The following diagram points to some options that may be available or used to enhance existing instream flows in the near term.



The schedule for evaluation, amendment or creation of instream flow rules integrated with water quality Total Maximum Daily Load (TMDL) work for river basins in the Central Puget Sound region follows. TMDL estimates are through fiscal year 2006 and through 2005 for instream flow work.

WRIA	SCHEDULE FY 02-06 Ecology Actions <sup>1</sup> Instream Flows through 2005 and TMDLs through 2006
5 Stillaguamish  IF Recommendation:	Initiate setting IFs, publish CR-101 by November 15, 2002. Complete rule making in cooperation with the Stillaguamish Implementation Review Committee by July, 2003, if the existing instream flow assessments are sufficient. Implement stream gauging program by fall 2002 at 12 locations in basin in support of IRPP and TMDL work.
TMDL	Stillaguamish & Portage Cr. FC, DO, Turbidity TMDL Technical Report(02)Submittal(03)DIP(04) Implementation(05) Effectiveness Monitoring(06)

<sup>1</sup> Numbers after TMDL work refer to the fiscal year in which the activity will take place.

WRIA	SCHEDULE FY 02-06 Ecology Actions <sup>1</sup> Instream Flows through 2005 and TMDLs through 2006
7 Snohomish • IF Recommendation:	July 2004 if non -2514. May be planning under ch. 90.82 RCW. Engage in CPSI process
TMDL	Snohomish River Ammonia, BOD TMDL; Implementation (ongoing) possible reallocation of waste loads (03-4). Lower Snohomish Tributaries Fecal Coliform TMDL; DIP (03), Implementation (03-06). Snoqualmie River Ammonia, BOD TMDL; Implementation (ongoing), follow-up monitoring (03). Raging River pH TMDL (reassessment 03). Various unaddressed 303(d) parameters remain in Skykomish, Snohomish mainstem, Snoqualmie basins (metals, temperature, other).  Flow is a critical concern in all portions of the Snohomish basin. Low flows concentrate bacteria levels, exacerbate low dissolved oxygen levels. Low pH values and BOD levels are also affected by availability of flows, primarily during critical low flow months
8 Cedar/Sammamish (Cedar River & Lake Washington)	Engage with CPSI and Near Term Action Agenda under WRIA process. IF Recommendation: FY 05-06
TMDL	Beaver Lakes I & II Submittal(03), DIP(04)Implementation(05-06), Phosphorus TMDL  North Creek FC TMDL – Submittal(02), DIP(03)Implementation (04-06)  Issaquah Creek System – Work with KCDNR on Developing innovative TMDL Scope
9 Duwamish/Green (Green Duwamish River watershed)	Engage with CPSI and Near Term Action Agenda under WRIA process. IF Recommendation: FY 05-06
TMDL	Scope Green/ Duwamish & Elliot Bay multi-parameter TMDL Submittal/DIP(06) Monitoring and Modeling , Partner is KCDNR
10 Puyallup/White	Engage with CPSI and Near Term Action Agenda under WRIA process. Continue with PSE Lake Tapps project.

Deleted:



WRIA	SCHEDULE FY 02-06 Ecology Actions <sup>1</sup> Instream Flows through 2005 and TMDLs through 2006
	IF Recommendation: FY 05-06
TMDL	South Prairie Cr. FC TMDL , Modeling/Tech. Report (02) Submittal(03) DIP(04) Implementation(05-06)  U. White River Temperature TMDL Monitoring and Modeling (02) Submittal(03) DIP(04), Implementation(05)  Lower White River pH TMDL- Tech Report(02) Submittal(03) Implementation (04-06)  Meeker Ditch & Clark's Cr. FC, DO, pH,Temp. TMDL – Monitoring & Modeling(03) Submittal(04) DIP(05) Implementation(06).
12 Chambers/Clover	2514 not taking on flows at this time/ Surface waters closed. Engage with CPSI and Near Term Action Agenda
TMDL	Steilacoom Lake TP TMDL Awaiting Consultant Study Results(02-03) Developing Technical Study(04) Submittal(05) DIP(06) Scope

The Instream Flow Task Group recognizes that a lot of work needs to be done to move from our current scientific and regulatory understanding of instream flows to the preferred future. Recommendations for further action include:

- a. Establish stream monitoring and reporting goals and objectives for both water quantity and quality and then expand the regional gauging and monitoring network;
- b. Evaluate the instream flow habitat needs of salmonid species listed as threaten or endangered under the Endanger Species Act based on modern assessment methods and explicitly address the flow habitat needs of listed species;
- c. Use modern assessment methods like normative flows to better understand the ecological functions created and maintained by flowing water;
- d. Convene a regional instream flow conference to gain a better understanding of how to create and implement modern management schemes that ensure stream and river flows more closely mimic natural flow regimes. Flow regimes that mimic natural flows are thought to lead to properly functioning freshwater habitat that in turn assists in the recovery of listed salmonid species;

- e. Develop and pilot an alternative instream flow management framework (legal and administrative); and
- f. Setting and/or updating some instream flow rules using the information gained from more recent assessments of instream needs, recent work done under Habitat Conservation Plans and a modern, real-time, regulatory framework.

#### Gauging & Monitoring

A first step for the CPSI is to define the goals and objectives for both water quantity and quality data collection. Clarify the purpose and elements of a database; build a data base that can be mined for any model rather than to plug into an existing model, e.g. PRISM or CRYSTAL. Then create a catalogue of where data is needed. Data collection supports long term adaptive management and evaluation process. This requires funding. As a component of water resource management, data should be gathered, managed, and accessible to all via a centralized clearing house. Currently, some data is collected but not shared, e.g. groundwater monitoring. Regional data collection and management would complement efforts by USGS, state, county and WRIA technical staff. The CPSI should consult with the WRIA process to develop products that meet their needs. The CPSI should be collecting surface and ground water (quantity and quality data). Initiate collection of data on climate change and potential impacts to water management. The collection of this data should be used to more closely correlate permitting and development activities to environmental impacts.

#### Evaluate the instream flow needs of salmonid species listed under the ESA

The current instream flow regimes in rules were not created to protect and provide a flow of water sufficient to maintain the habitat for either Chinook salmon or Bull trout. Assessments of instream flow habitat needs for those species should be done over the range of habitat potentially usable. If the CPSI explicitly adopts and achieves an instream flow based on the needs of listed species, that should assist in attaining properly functioning freshwater habitat conditions and in turn lead to delisting of those species. The CPSI will coordinate with and build upon the efforts of the Shared Strategy process and local watershed efforts.

#### Normative flows

The Statewide Strategy to Recover Salmon, Extinction is Not an Option states "protection of salmon requires stream flows to fluctuate within the natural flow regime for a given location and season." In support of this position, the State's Independent Science Panel calls for instream flow analyses that "provide for both the spatial requirements of different life stages, as well as flows that promote and maintain ecological and hydrological functions and connectivity to important in-channel habitats and adjoining features." These views reflect the assumption that salmon developed, adapted, and

thrived under ecological conditions that were partly created by, and closely related to, the natural flow regime--the timing, duration, frequency, magnitude, and rate of change in flows in the stream or streams that provided habitat for the fish.

It is not necessary to go back to pristine flow conditions, rather to mimic the natural system and provide sufficient instream flow to create and maintain fish habitat.

King County's Normative Flows Project is an effort to develop an analytical approach, and management tools, that will link flows and flow regimes to creation or restoration of the important ecological conditions necessary for sustainable fisheries. The counties programs and policies are the primary client or reason they are conducting the normative flows study. They will be using normative flow findings to guide King County decisions (e.g. stormwater, flood control) and that will likely generate regional benefits. Their effort could provide value to a regional water strategy in at least three ways: (1) provide the scientific basis for instream flow components of watershed-based salmon conservation plans, or water resource management plans, (2) provide a portion of the technical work for state agency rulemaking with regard to meeting the statutory objectives of instream flow setting; and (3) provide participating parties a set of tools that can be used on different scales to guide management decisions related to stream flows and habitat.

#### An instream flow conference

The state of knowledge on how to assess instream flow needs and then how to manage a watershed is rapidly changing. To gain a better understanding of how to create and implement modern water management schemes that ensure stream and river flows more closely mimic natural flow regimes a conference of leading academic, government, and practitioners in the field of instream flow management would be held. The conference will have a specific emphasis on watersheds found in the Pacific Northwest. The outcome of the conference would be to produce recommendations and offer advice on:

- preferred instream flow assessment methodologies;
- comprehensive and unified approaches that can be applied in diverse administrative and environmental settings; and
- adaptive management.

#### An alternative instream flow management framework

Developing and piloting an alternative instream flow management framework (both legal and administrative) based on shared decision making with all interested parties in the watershed may lead to better instream flow management. To develop a model, the IFTG recommends that we first clarify the desired attributes of a real water management system, and the desired outcome. It is recommended that we move to an incentive-based system, develop performance outcomes, monitor actions, and then re-calibrate management as needed. A management framework requires anticipation of future needs, and must provide some degree of flexibility. Smaller utilities may have more difficulty with a performance-based system than large systems. Perhaps this type of management framework works best if there is storage in upper basins that can augment low stream

flow. Having all interested stakeholders provide input to, and ultimately support, the overall vision for instream flow management in their basin will, hopefully, lead to a better chance of success. Success will only be attained with the active participation of those who live, work, and play in the watersheds of Central Puget Sound. The idea is that iterative, tuned management of the river is better for the system than the "just meet instream flows idea.

Work has already been done in both the Cedar River and Green River basins to start creating an alternative instream flow management framework. Whether or not those models will work in other basins is unknown. The model Seattle Public Utilities employees in the Cedar River basin is collaborative and implemented by the Cedar River Instream Flow Commission (Commission). The Commission is composed of representatives from state, federal, Tribal and County natural resource management agencies and the City of Seattle. The Commission was convened in the summer of 2000, shortly after approval of the HCP. The group meets once per month, or more often if needed, to help guide both real-time stream flow management and to develop and implement the research and monitoring program. Fairly soon after its formation, the Commission was challenged with the fall/winter drought of 2000/2001. Commission members were very actively engaged in the management of the Cedar River and their efforts paid-off in a number of ways including a very successful municipal water use curtailment program and the largest recorded production of Cedar River sockeye salmon fry.

Although challenged by the 2001 drought, the Commission was able to develop a research and monitoring program composed of nine study elements and nineteen study questions. Several elements of the program are presently underway including investigations of the effects of stream flow on steelhead spawning distribution and incubation success, spatial and temporal distribution of Chinook spawning activity, and juvenile Chinook rearing habitat. Later this year, the Commission will launch a study investigating the degree to which managed stream flows in the Cedar differ from flows that would have occurred under pre-development conditions. This investigation is viewed as the first step in a much more complex analysis of the relationships between hydrology and natural ecological processes in the Cedar River. These studies, in addition to others identified by the Commission, will inform the manner in which the management flexibility reserved by the HCP is applied to stream flow management.

While potentially attractive, the alternative instream flow management framework has a number of outstanding issues that need to be resolved including:

- The consequences to a specific utility if flows were not achieved and who makes decisions about what options to use, e.g. in a dry year, between decreasing withdrawals or source exchange?
- Who pays with a regional vision, should there be regional funding for a management strategy?
- Should apportionment agreements be developed that set defined contributions to meet instream flow objectives?

- Utilities have authority to manage their own systems and water use decisions but what is their responsibility for flow management beyond those with instream flow proviso on their water right?

#### Setting and/or updating instream flow rules

Ecology has been instructed by the Legislature to set instream flows in fish critical basis not planning under chapter 90.82 RCW (aka 2514). These basins include the Stillaguamish, Cedar, Green and Puyallup River basins. There was lack of consensus in the IFTG whether, from a regulatory standpoint, to open up the Cedar River and Green River Instream Resource Protection Plans to update instream flow rules to reflect HCP flows for selected control points. Should the HCP agreements be included in the regulatory scheme? If HCP flows are institutionalized beyond the contract nature of an HCP there could be more certainty; it could be done as a pilot.

Tributary issues may need more attention than the mainstem rivers. Currently most of the tributary systems within the CPSI are closed to future consumptive use. Should instream flows be set for tributaries? Actual management of water goes beyond setting flows, is difficult and costly, and requires social/political buy-off.

New administrative rules using the information gained from more recent assessments of instream needs, recent work done under Habitat Conservation Plans, FERC project licenses could lead to a modern, real-time, regulatory framework. The current instream flow rules for all basins, except the Stillaguamish, were adopted over twenty years ago. As stated previously, the instream flows in rule are not attained very often and are not biologically based.

Any new work on instream flows by the State will be coordinated with WRIAs and support the creation and implementation of salmon recovery planning being done within the region. Water quality and stormwater management must be link with instream flow management regime. And finally an instream flow strategy should articulate how State actions within water management will contribute to achieving instream flows, e.g. enforcement.

In addition, the idea of sustainability criteria and how to measure that over time will be very challenging.

#### Policy Recommendations

Policy recommendations of the IFTG include:

- A bias towards keeping existing closures in place;

- Enforcement against illegal water users must be a priority activity of the Department of Ecology;
- All water use in the CPSI should be metered and surface water uses greater than 200 acre-feet per year should be reported.
- County permitting activity should discourage the use of exempt wells within the Urban Growth Boundry developed under the Growth Management Act and within the claimed service areas of utilities;
- Stormwater runoff to the maximum extent possible should be retained on site;
- State and local permitting activites need to include and evaluation of the impact of those actions on local base flows;
- The impact of infiltration and inflow to the sewer system should be significantly reduced. New construction of sewers should be done to minimize infiltration and inflow; and
- The return or use of treated waste water (reclaimed water) to its basin of origin should be increased.

### Summary

The goal of the doing the actions recommended above is to set strategies to supply water in sufficient quantities to satisfy minimum instream flows for fish and to provide water for identified future out-of-stream needs. We must build and maintain long term institutional capacity to set, achieve, and maintain instream flows. By changing our instream flow management as outlined water will be managed instream in a manner that supports vibrant communities and a healthy environment.

### For more information:

<http://www.ecy.wa.gov/programs/wr/instream-flows/>  
<http://www.wrialproject.wsu.edu/>  
<http://www.instreamflowcouncil.org/justreleased.html>

Should we have more on:

Schedule of work - who pays, who manages to the future (state support with funding and some form of regional revenue sharing or tax. Watershed characterizations. Assigned responsibilities for stewardship and state agency responsibilities.

303d listed water bodies/TMDL work

2496 references/links to WRIAs - where have instream flows been identified as limiting?

More on Salmon Strategy

Josh's ideas

- Bob Wubbena will provide documents from the blue ribbon committee on implementation of watershed plans.
- The preliminary draft Strategy, to be crafted after the next workshop, will be shared with TG participants prior to public release.